

AMENDED CLAIMS

1. (Currently amended) A method for fabricating a flip-chip light emitting diode device, the method including:

(a) depositing epitaxial layers on a growth substrate to produce, an epitaxial wafer;

(b) fabricating a plurality of light emitting diode devices on the epitaxial wafer;

(c) dicing the epitaxial wafer to generate at least one separated device die from the epitaxial wafer, said device die including at least one of the plurality of the light emitting diode devices and a portion of the growth substrate;

(d) flip chip bonding the device die to a mount, said flip chip bonding including securing the device die to the mount by bonding an electrode of the device die to a bonding pad of the mount; and,

(e) subsequent to step (d), removing at least some of the growth substrate from the device die by laser lift-off.

2. (Original) The method of claim 1, further comprising:

(f) prior to step (e), providing a support material that supports the device die relative to the mount.

3. (Original) The method of claim 2, wherein step (f) comprises:

providing the support material in a flowable form that contacts the device die and the mount; and,

hardening the support material into a non-flowable form.

4. (Original) The method of claim 2, further comprising:

(g) subsequent to step (e), removing the support material.

5. (Original) The method of claim 2, wherein the support material is not electrically active.

6. (Currently amended) The method of claim 1, wherein step (e) comprises:
removing substantially the entire portion of the growth substrate from the device die by laser lift-off employing an excimer laser.

7. (Currently amended) The method of claim 6, wherein step (e) comprises:
illuminating the portion of the growth substrate included on the device die with laser light generated by the excimer laser.

8. (Original) The method of claim 7, wherein the growth substrate is made of sapphire and the laser light is ultraviolet laser light.

9-10. (Canceled)

11. (New) The method as set forth in claim 1, wherein the step (e) comprises:
applying laser light selected to degrade an interface between the sapphire growth substrate and the epitaxial layers.

12. (New) The method as set forth in claim 11, wherein the degrading of an interface between the sapphire growth substrate and the epitaxial layers includes formation of gallium metal and nitrogen, and the step (e) further comprises:
elevating a temperature whereby the gallium metal melts and allows the sapphire growth substrate to be removed.

13. (New) The method as set forth in claim 12, wherein the step (e) further comprises:
cleaning residual gallium metal from a surface exposed by removal of the sapphire growth substrate.

14. (New) A method for fabricating a flip-chip light emitting diode device, the method comprising:

depositing epitaxial layers on a sapphire growth substrate to produce an epitaxial wafer;

fabricating a plurality of light emitting diode devices on the epitaxial wafer;

dicing the epitaxial wafer to generate a device die;

flip chip bonding the device die to a mount, the flip chip bonding including securing the device die to the mount by bonding at least one electrode of the device die to at least one bonding pad of the mount; and

with the device die flip chip bonded to the mount, removing the sapphire growth substrate of the device die using a laser lift-off process.

15. (New) The method as set forth in claim **14**, wherein the removing the sapphire growth substrate of the device die using a laser lift-off process comprises:

applying laser light selected to degrade an interface between the sapphire growth substrate and the epitaxial layers.

16. (New) The method as set forth in claim **15**, wherein the degrading of an interface between the sapphire growth substrate and the epitaxial layers includes formation of gallium metal and nitrogen, and the removing the sapphire growth substrate of the device die using a laser lift-off process further comprises:

elevating a temperature whereby the gallium metal melts and allows the sapphire growth substrate to be removed.

17. (New) The method as set forth in claim **16**, wherein the removing the sapphire growth substrate of the device die using a laser lift-off process further comprises:

cleaning residual gallium metal from a surface exposed by removal of the sapphire growth substrate.

18. (New) The method as set forth in claim **14**, further comprising:
applying a stress relief agent comprising an underfill material to the device die
prior to the removing of the sapphire growth substrate of the device die.

19. (New) The method as set forth in claim **14**, further comprising:
applying a coating material to the device die prior to the removing of the sapphire
growth substrate of the device die.

20. (New) The method as set forth in claim **19**, wherein the coating material
provides temporary support during the laser liftoff process, the method further
comprising:
removing the coating material after the laser liftoff process is completed.